

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-20 (cancelled)

21. (New) A microfluidic device comprising:

(i) a first microchannel comprising a plurality of spatially distinct regions upon which a member of a specific binding pair is immobilized;

(ii) at least a first entrance port and at least a first exit port for the transportation of at least one test sample;

(iii) a fluid propelling component that controls that flow rate of said test sample; and

(iv) a recirculating arm for recirculating said test sample across a spatially distinct regions.

22. (New) A microfluidic device according to Claim 21, wherein said first microchannel is serpentine.

23. (New) A microfluidic device according to Claim 21, further comprising at least one valve in said exit port.

24. (New) A microfluidic device according to Claim 21, wherein said first microchannel branches into multiple second microfluidic channels each of which comprises a plurality of spatially distinct regions upon which a member of a specific binding pair is immobilized.

25. (New) A microfluidic device according to Claim 21 or 24, wherein said device is fabricated from a material selected from the group consisting of silicon, silicon dioxide, glass, plastic and ceramic.

26. (New) A microfluidic device according to Claim 21, where in said spatially distinct regions comprise porous polymers.

27. (New) A microfluidic device according to Claim 21, wherein each of said spatially distinct regions has a different member of a specific binding pair immobilized thereto.

28. (New) A microfluidic device according to Claim 26, wherein said porous polymer is a hydrogel pad.

29. (New) A microfluidic device according to Claim 28, wherein said hydrogel pad is a patterned gel pad further comprising spatially separated portions within said hydrogel pad.

30. (New) A microfluidic device according to Claim 1, wherein said spatially distinct regions in said microchannel comprise beads with said member of said specific binding pair immobilized thereto.

31. (New) A microfluidic device according to Claim 21, wherein said spatially distinct regions comprise microstructures fabricated into said microchannel.

32. (New) A microfluidic device according to Claim 21, wherein said microstructures comprise a series of columns molded into said first microchannel.

33. (New) A microfluidic device according to Claim 21, wherein said microstructures comprise domes molded into said first microchannel.

34. (New) A microfluidic device according to Claim 21, wherein said specific binding pair members are nucleic acids.
35. (New) A microfluidic device according to Claim 34, wherein said nucleic acid is a DNA.
36. (New) A microfluidic device according to Claim 34, wherein said nucleic acid is a RNA.
37. (New) A microfluidic device according to Claim 21, wherein said specific binding pair members are proteins.
38. (New) A microfluidic device according to Claim 37, wherein the proteins for one member of said specific binding pair are antigens.
39. (New) A microfluidic device according to Claim 37, wherein the proteins for one member of said specific binding pair are antibodies.
40. (New) A microfluidic device according to Claim 21, wherein said fluid propelling component comprises a pressurized gas, a vacuum, an electrical field, a magnetic field or a centrifugal force.
41. (New) A method of detecting a specific binding member in a test sample, said method comprising passing said test sample through the microfluidic device described in Claims 21, 22 or 24 to form a binding pair.
42. (New) A method according to Claim 41, wherein said test sample is recirculated.
43. (New) A method according to Claim 41, wherein the flow rate of said test sample is adjusted using a fluid propelling component to increase contact between said binding pairs.

44. (New) A method according to Claim 41, wherein said fluid propelling component comprises a pressurized gas, a vacuum, an electrical field, a magnetic field or a centrifugal force.